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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/840,663 | 04/23/2001 | Andrew Bishop | Q01-1066-US1 | 4138 |
| 32093 | 7590 | 03/25/2004 | EXAMINER | |
| HANSRA PATENT SERVICES 4525 GLEN MEADOWS PLACE BELLINGHAM, WA 98226 | | | TZENG, FRED | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2651 | |
| DATE MAILED: 03/25/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/840,663

Applicant(s)

BISHOP, ANDREW

Examiner

Fred Tzeng

Art Unit

2651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-25 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6,7,12,15-17 and 19 is/are rejected.
- 7) ☒ Claim(s) 3,5,8-11,13,14 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-25 are presented for examination.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Drawings

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. Claim 5 recites the limitation "said read amplifier" in line 2. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 25 recites the limitation "said transmission gates" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 4, 6, 7, 12, 15-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balakrishnan (USPN 5,754,369) in view of Zinke et al (USPN 5,880,614) hereafter as Zinke.

Regarding claim 1, Balakrishnan discloses the invention substantially as claimed. Balakrishnan discloses a read/write device for a disk drive (see column 3 lines 66-67), having a pre-amplifier (see column 4 lines 45-47) and a recording head (see column 4 lines 1-2 or figure 6, i.e., head 20), comprising: a write signal path between the pre-amplifier and the recording head (see column 4 lines 7-8 or column 7 lines 51-52 or figure 6, i.e., the write signal path 62A-62B between pre-amp 54 and head 20), the write signal path having a write current (see column 4 lines 7-8); a read signal path between the pre-amplifier and the recording head (see column 4 lines 9-11 or column 7 lines 55-57 or figure 6, i.e., the read signal path 60A-60B between pre-amp 54 and the head 20), the read signal path having an induced current related to the write current (see column 7 lines 57-63 and figure 6, i.e., common knowledge in the art, there will be an induced current between the read signal path 60A-60B and the write signal path 62A-62B by mutual inductance as they are cross-coupling together. This concept is clearly explained by the prior art presented in this instant application, page 1 lines 15-20).

However, Balakrishnan does not disclose a shunt path in the pre-amplifier to draw a part of the induced current from the read signal path.

Zinke teaches a method for drawing/shunt away induced current from a current mirror circuit arrangement for evaluating the output signals of an active sensor (see column 1 lines 55-65).

Balakrishnan and Zinke are combinable as they are from the same field of endeavor, i.e., dealing with sensor current. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate Zinke's induced current drawn/shunt away method into Balakrishnan's system of multi-element read/write head/slider assembly in order to reduce the coupling effect occurred within the system due to mutual inductance for the purpose of enhancing a disk drive's data read/writing capability and its performance. Because Zinke's induced current drawn/shunt away method can achieve a reliable identification of the output signals of an active sensor (see column 1 lines 35-40 of Zinke reference).

Regarding claim 2, Balakrishnan discloses a sensor in the recording head coupled to the read signal path (see column 1 lines 53-67 and figure 6).

Regarding claim 4, Balakrishnan discloses a read amplifier in the pre-amplifier (see column 4 lines 45-47).

Regarding claim 6, Zinke discloses that the shunt path includes a set of transmission gates (see column 4 lines 30-36 or figure 5A).

Regarding claim 7, Zinke discloses that the set of transmission gates includes a first transistor and a second transistor (see figure 5A or column 4 lines 30-36).

Regarding claim 12, Balakrishnan discloses that the pre-amplifier includes a write driver to generate the write current in the write signal path (see column 7 lines 50-52).

Regarding claims 15 and 19, Balakrishnan discloses the invention substantially as claimed. Balakrishnan discloses a read/write device (see column 3 lines 66-67), comprising: a write signal path having a write current (see column 4 lines 7-8), the write current to induce an induced current in a read signal path (see column 7 lines 57-63 and figure 6, i.e., common knowledge in the art, there will be an induced current between the read signal path 60A-60B and the write signal path 62A-62B by mutual inductance as they are cross-coupling together).

However, Balakrishnan does not disclose a shunt path coupled to a read amplifier to shunt the induced current from the read signal path.

Zinke teaches a method for drawing/shunt away induced current from a current mirror circuit arrangement for evaluating the output signals of an active sensor (see column 1 lines 55-65).

Balakrishnan and Zinke are combinable as they are from the same field of endeavor, i.e., dealing with sensor current. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate Zinke's induced current drawn/shunt away method into Balakrishnan's system of multi-element read/write head/slider assembly in order to reduce the coupling effect occurred within the system due to mutual inductance for the purpose of enhancing a disk drive's data read/writing capability and its performance. Because Zinke's induced current

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drawn/shunt away method can achieve a reliable identification of the output signals of an active sensor (see column 1 lines 35-40 of Zinke reference).

Regarding claim 16, Balakrishnan discloses a sensor coupled to the read signal path (see column 1 lines 53-67 and figure 6).

Regarding claim 17, Zinke discloses that the shunt path comprises two transmission gates (see column 4 lines 30-36 or figure 5A).

Allowable Subject Matter

8. Claims 3, 5, 8-11, 13, 14 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

Claim 3 is allowable because none of the prior art of record specifically teaches or fairly suggests a read/write device for a disk drive, having a pre-amplifier and a recording head including a sensor, comprising of a write signal path and a read signal path all coupled between the pre-amplifier and the recording head, wherein the write signal path having a write current and the read signal path having an induced current related to the write current and the sensor is coupled to the read signal path; and the induced current generates a sensor current of about 0.25 milliamps; and a shunt path in the pre-amplifier to draw a part of the induced current from the read signal path.

Claims 5, 11 and 18 are allowable because none of the prior art of record specifically teaches or fairly suggests a read/write device for a disk drive, having a pre-amplifier and a recording head including a sensor, comprising of a write signal path and a read signal path all coupled between the pre-amplifier and the recording head, wherein the write signal path having a write current and the read signal path having an induced current related to the write current and the sensor is coupled to the read signal path; and the induced current generates a sensor current of about 0.25 milliamps; and a shunt path having a resistance of about 10 ohms in the pre-amplifier to draw a part of the induced current from the read signal path, wherein the shunt path is coupled between the read signal path and a read amplifier.

Claims 8-14 are allowable because none of the prior art of record specifically teaches or fairly suggests that the shunt path (in view of above rationale) includes a first transistor and a second transistor, wherein the first transistor is an n-channel transistor and the second transistor is a p-channel transistor, and the transistors having a low drain-to-source channel resistance.

Claims 20-25 are allowable over the prior art of record because none of the prior art of record teaches or fairly suggests a system or method for limiting a sensor current in a magneto-resistive sensor, comprising of the steps of: inducing a voltage and a current in a read signal path coupled to the sensor and shunting the induced current with a shunt path which is opposite of the sensor on the read signal path.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 308-9051, (formal communications, please mark

"EXPEDITED PROCEDURE")

Or:

(703) 308-6606 (for informal or draft communications, please label

"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021

Crystal Drive, Arlington. V.A., Sixth Floor (receptionist).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Tzeng whose telephone number is 703-305-4841.

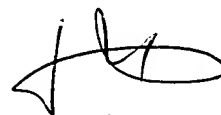
The examiner can normally be reached on weekdays from 9:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 703-308-4825. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-746-5710 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

A handwritten signature in black ink, appearing to be 'Fred F. Tzeng', with a stylized, cursive script.

Fred F. Tzeng

March 16, 2004